

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/02130

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: D04H 1/48, A44B 18/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: D04H, A44B, A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI, EPODOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP6033359 A (KURARAY CO LTD) 1994-02-08 (abstract) World Patents Index (online, London, U.K.: Derwent Publications, Ltd. (retrieved on 2000-02-18). Retrieved from: EPO WPI Database. DW1994, Accession No. 1994-080418; & JP 6033359 A (KURARAY CO LTD) 1994-02-08 abstract (online) (retrieved on 2000-02-18). Retrieved from: EPO PAJ Database; & JP 6-33359 A (KURARAY CO LTD) 1994-02-08, the whole document	1-11
Y	--	12-21
Y	WO 9507677 A1 (THE PROCTER & GAMBLE COMPANY), 23 March 1995 (23.03.95), the whole document	12-21
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☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"T" earlier document but published on or after the international filing date

"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

& document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

18 February 2000

13 -03- 2000

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 99/02130

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0765616 A1 (JAPAN VILENE COMPANY. LTD.), 2 April 1997 (02.04.97) --	1-21
A	EP 0258015 A2 (MINNESOTA MINING AND MANUFACTURING COMPANY), 2 March 1988 (02.03.88) --	1-21
A	WO 9517111 A1 (KIMBERLY-CLARK CORPORATION), 29 June 1995 (29.06.95) --	1-21
A	EP 0780505 A2 (DUFLOT INDUSTRIE (SA)), 25 June 1997 (25.06.97) -- -----	1-21

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/12/99

International application No.

PCT/SE 99/02130

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
WO	9507677	A1	23/03/95	AU	7833294 A	03/04/95
				CA	2170494 A	23/03/95
				DE	69419162 D,T	18/11/99
				EP	0719126 A,B	03/07/96
				JP	9502637 T	18/03/97
				US	H1640 H	04/03/97

EP	0765616	A1	02/04/97	US	5786060 A	28/07/98

EP	0258015	A2	02/03/88	CA	1298066 A	31/03/92
				DE	3788386 D,T	23/06/94
				JP	2693156 B	24/12/97
				JP	63063405 A	19/03/88
				US	4761318 A	02/08/88

WO	9517111	A1	29/06/95	AU	685893 B	29/01/98
				AU	1301695 A	10/07/95
				BR	9408371 A	19/08/97
				CA	2120645 A	22/06/95
				CN	1142750 A	12/02/97
				EP	0735830 A	09/10/96
				FR	2714122 A,B	23/06/95
				GB	2285093 A,B	28/06/95
				GB	9425785 D	00/00/00
				PL	176063 B	31/03/99
				PL	315149 A	14/10/96
				US	5707707 A	13/01/98
				ZA	9410129 A	25/08/95

EP	0780505	A2	25/06/97	FR	2742773 A,B	27/06/97

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

15

Applicant's or agent's file reference 52297-57320	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/SE99/02130	International filing date (day/month/year) 19/11/1999	Priority date (day/month/year) 19/11/1998
International Patent Classification (IPC) or national classification and IPC D04H1/48		
Applicant SCA HYGIENE PRODUCTS AB et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 16 06 2000	Date of completion of this report 07 02 2001
Name and mailing address of the international preliminary examining authority  European Patent Office D-80298 Munich Tel: +49 89 2399-0 Tx: 523656 epmu d Fax: +49 89 2399-4465	Authorized officer Pregetter, M Telephone No: +49 89 2399 8379 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/SE99/02130

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

Description, pages:

1-13 as originally filed

Claims, No.:

1-21 as received on 21/12/2000 with letter of 15/12/2000

Drawings, sheets:

1/4-4/4 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/SE99/02130

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-21
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-21
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-21
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

Re Item V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Reference is made to the following documents:

D1: EP-A2-0780505
D2: EP-A1-0765616
D3: JP-A-06033359
D4: WO-A1-9507677

2. Document D1, which is considered to represent the most relevant state of the art, discloses (cf. column 2, lines 5-11 and lines 41-53; column 5, lines 5-19; column 5, line 48-column 6, line 21; column 8, lines 36-49; figures):

"Nonwoven fabric that includes a surface for fastening the male component of a hook and loop fastener system, comprising a needled fabric of functional fibres and binding fibres, wherein the functional fibres are comprised of thermoplastic polymer fibres, and wherein the nonwoven fabric is bonded by partially melting the binding fibres."

Furthermore, this subject-matter is also disclosed by document D2 (cf. column 1, line 47-column 2, line 9; column 2, line 34-column 3, line 3; column 4, lines 4-24; column 6, lines 17-36; figures 1-3).

The subject-matter of present claim 1 differs from these disclosures in that the fabric is loop-free and carded.

None of the cited documents shows the combination of features of the subject-matter of present claim 1, which is therefore novel with respect to the cited prior art (Article 33(2) PCT).

3. The problem to be solved thereby may therefore be regarded as providing an alternative structure for a fibrous web which can subsequently be needled and heat bonded.

This is obtained by combination of the distinguishing features mentioned above.

No indications for this solution can be found in any of the documents D1-D4.

Document D3 (cf. abstract) discloses a non-woven fabric that includes a surface for fastening the male component of a hook and loop fastener system which comprises a fabric of thermoplastic polymer fibres which is obtained by forming a fibrous web by carding, the fibrous web being subsequently needled and heat bonded.

Document D4 relates to a reinforced composite structure for fastening the male component of a hook and loop fastener system. Its structure does not comprise a carded web of functional fibres and binding fibres.

The subject-matter of claim 1 is therefore also considered as involving an inventive step with respect to the cited prior art (Article 33 (3) PCT).

4. The industrial applicability of the nonwoven fabric according to claim 1 is obvious (Article 33(4) PCT).
5. Independent claim 9 defines the method of producing the respective nonwoven material and independent claim 21 relates to the use of the respective nonwoven material. Therefore, the subject-matter of these claims fulfills the requirements of Article 33(2), (3) and (4) PCT for the reasons mentioned above.
6. Claims 2-8 and 10-20 define additional features of the invention according to claims 1 and 9 and as such also meet the requirements of the PCT with respect to novelty and inventive step with respect to the cited prior art.

Re Item VII

Certain defects in the international application

1. Independent claims 1, 9 and 21 are not in the two-part form in accordance with Rule 6.3(b) PCT with those features known in combination from the prior art

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/SE99/02130

(document D1) being placed in the preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

2. The units "denier" employed page 6, line 23 are not additionally expressed in terms of the unit stipulated by Rule 10.1(a) PCT, i.e. in terms of "tex".

NEW CLAIMS

1. Nonwoven fabric that includes a surface for fastening the male component of a hook and loop fastener system which comprises a loop-free, carded and needled fabric of functional fibres and binding fibres, where the functional fibres are comprised of thermoplastic polymer fibres, and where the nonwoven fabric is bonded by partially melting the binding fibres.
2. A nonwoven fabric according to Claim 1, **characterised** in that the functional fibres are comprised of one or more types of polyester fibres and/or polypropylene fibres.
3. A nonwoven fabric according to Claim 2, **characterised** in that the fabric includes two types of functional polyester fibres of mutually different thickness.
4. A nonwoven fabric according to any one of Claims 1-3, **characterised** in that the functional fibres include spiralled bi-component fibres or multi-component fibres of the side-by-side type.
5. A nonwoven fabric according to Claim 4, **characterised** in that the functional fibres include both crimped polyester fibres and spiralled fibres.
6. A nonwoven fabric according to any one of Claims 1-5, **characterised** in that the fabric contains 10-25% by weight binding fibres and 75-90% by weight functional fibres.
7. A nonwoven fabric according to any one of Claims 1-6, **characterised** in that 40-60% by weight of the functional fibres are spiralled fibres.
8. A nonwoven fabric according to any one of Claims 1-7, **characterised** in that the binding fibres comprise bi-component fibres that include a core and an outer

casing, where the outer casing component has a lower melting point than the inner core component.

9. A method of producing a nonwoven fabric that has a fastener surface according to Claim 1, **characterised** by carding a mixture of binding fibres and functional fibres comprised of thermoplastic polymer fibres to form a fibrous web; needling the fibrous web to obtain a dense material that has a loop-free, open structure suitable for the male component of a hook and loop fastener to fasten thereto; and heating the needled fibrous web so as to partially melt the binding fibres.

10. A method according to Claim 9, **characterised** by smooth calendering the needled and heated fibrous web so that one surface thereof will be smooth.

11. A method according to Claim 9 or 10, **characterised** in that the binding fibres are comprised of bi-component fibres that include a core and a casing, where said casing has a lower melting point than the core; and heating the needled fibrous web so that the casings of respective binding fibres will melt while the core remains solid.

12. An absorbent article (14), such as a diaper or incontinence guard, which includes a substantially liquid-impermeable backing sheet and a hook and loop fastener system that includes a female component and a male component attached to said backing sheet for mutual coaction such as to secure the article in position on a wearer, **characterised** in that the female component (1) of the system is comprised of nonwoven fabric according to any one of Claims 1-8.

13. An article according to Claim 12, **characterised** in that the article includes an absorbent body enclosed between a liquid-permeable inner sheet that lies proximal to the wearer in use and said substantially liquid-impermeable backing sheet that lies distal from the wearer in use, said backing sheet being delimited by two short sides (10, 11) and two long sides (12, 13), wherein two male-component tabs (2)

belonging to said fastener system are fastened to said backing sheet on each long side (12, 13) thereof close to one short side (10), so as to form an extension of the short side with the male component facing in the same direction as the inner sheet; and in that the female component (1) is provided on the backing sheet at the other short side (11).

14. An article according to Claim 13, **characterised** in that one female component piece (1) is provided in each corner of said second short side (11).

15. An article according to Claim 13, **characterised** in that the female component (1) is comprised of a strip that extends essentially along the full length of the second short side (11).

16. An article according to Claim 12, **characterised** in that said article includes two parts, a belt (15) which is intended to be fastened around the waist of a wearer, and an absorbent part (14) which, in use, is fastened to the belt by means of mutually coacting male and female components (1, 2) of the hook and loop fastener system and which includes an absorbent body enclosed between a liquid-permeable inner sheet intended to lie proximal to the wearer in use and said substantially liquid-impermeable backing sheet intended to lie distal from the wearer in use and delimited by two short sides (10, 11) and two long sides (12, 13), wherein the mutually coacting components (1, 2) are disposed along the short sides (10, 11) of said absorbent body and on said belt (15) respectively.

17. An article according to Claim 16, **characterised** in that the female component (1) is disposed on the inner surface of the belt (15) and the male component (2) is disposed on the outer surface of the absorbent body (14).

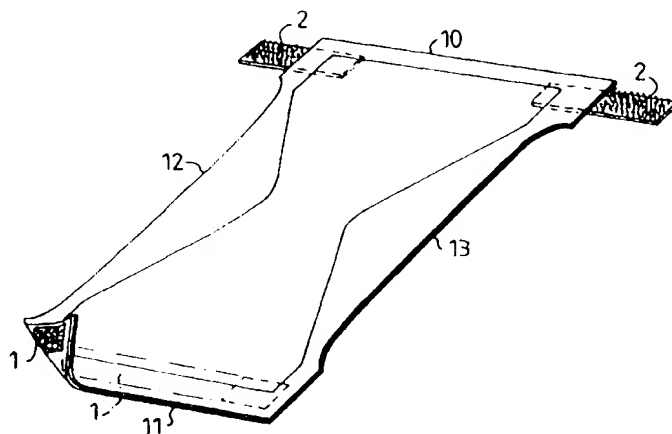
18. An article according to Claim 16, **characterised** in that the male component (2) is disposed on the inner surface of the belt (15) and the female component (1) is disposed on the outer surface of the absorbent body (14).

19. An article according to Claim 16, **characterised** in that the male component (2) is disposed on the outer surface of the belt (15) and the female component (1) is disposed on the inner surface of the absorbent body (14).
20. An article according to Claim 16, **characterised** in that the female component (1) is disposed on the outer surface of the belt (15) and the male component (2) is disposed on the inner surface of the absorbent body (14).
21. The use of a nonwoven fabric that includes a fastener surface according to any of claims 1-8, which comprises a carded and needled fibrous web of functional fibres and binding fibres, where the functional fibres are comprised of thermoplastic polymer fibres, and where the nonwoven fabric is bonded by partially melting the binding fibres, as the female component in a hook and loop fastener system in an absorbent article (14), such as a diaper or incontinence guard, which includes a substantially liquid-impermeable backing sheet and a hook and loop fastener system that includes a female component and a male component attached to said backing sheet for mutual coaction such as to secure the article in position on a wearer.

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : D04H 1/48, A44B 18/00	A1	(11) International Publication Number: WO 00/31330 (43) International Publication Date: 2 June 2000 (02.06.00)
(21) International Application Number: PCT/SE99/02130 (22) International Filing Date: 19 November 1999 (19.11.99) (30) Priority Data: 9803970-4 19 November 1998 (19.11.98) SE (71) Applicant (for all designated States except US): SCA HYGIENE PRODUCTS AB [SE/SE]; S-405 03 Göteborg (SE). (72) Inventor; and (75) Inventor/Applicant (for US only): MAGNUSSON, IngBritt [SE/SE]; Oxelvägen 22, S-435 37 Mölnlycke (SE). (74) Agents: BERG, S., A. et al.; Albihns Patentbyrå Stockholm AB, P.O. Box 5581, S-114 85 Stockholm (SE).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>In English translation (filed in Swedish).</i>

(54) Title: FASTENER MEANS



(57) Abstract

A nonwoven fabric (1) that includes a fastener surface for the male component (2) of a hook and loop fastener system, comprising a carded and needled fibrous web of functional fibres and binding fibres, where the functional fibres are comprised of thermoplastic polymer fibres and the nonwoven fabric is bonded by partially melting the binding fibres. A method of producing such nonwoven fabric (1) by carding a mixture of binding fibres and functional fibres to form a fibrous web, needling the fibres web to obtain a dense material that has a structure on which the male component of a hook and loop fastener system is able to fasten, and heating the needled fibrous web to partially melt the binding fibres. An absorbent article, such as a diaper, having an absorbent body enclosed between an outer and an inner sheet and including a hook and loop fastener system with which the article can be secured to a wearer, wherein the female component (1) of the system is comprised of nonwoven fabric according to the invention. The use of a nonwoven fabric that includes a fastener surface as the female component in a hook and loop fastener system in an absorbent article according to the invention.

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Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

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FASTENER MEANS

The present invention relates to a material that can function as a fastener surface for the male component of a hook and loop fastener system, to a method of producing said material, and to an absorbent article, such as a diaper, in which the material is used as fastener means, and to a use of said material as female component in a hook and loop fastener system in an absorbent article.

In absorbent articles, such as diapers and incontinence guards for instance, the article is often secured to the wearer with the aid of a hook and loop fastener system. Such fastener means comprise a male and a female component, where the former is comprised of hooks and the latter is comprised of loops. These two fastener components can be fastened together and thereafter separated from one another.

The fastener devices comprise loops and hooks formed on one side of a fibre tape which is bonded to a carrier tape. The opposite surface of the carrier tape is suitably adhesive, so as to enable the tape to be fastened easily to an article.

The described two-layer construction that includes a carrier is necessary in order to ensure that the fastener device will be sufficiently strong and can be fastened to an absorbent body, e.g. glued thereto.

Known loop-carrying tape material is formed, e.g., by gluing a loop-carrying fibrous web to a carrier web, by needling loops from a fibrous web through a carrier web, or by melting one surface of a loop-carrying fibrous web that includes hot hotmelt fibres, so as to obtain a coherent carrier surface. Such materials are described in, for instance, EP-A2-0780505, WO96/04812, WO95/33390, WO92/20251, US-A-3,694,867, EP-A2-0258015, WO95/17111 and EP-A1-0765616.

One drawback with such fastener devices is that the laminate construction is not cost-effective, due to material consumption on the one hand and to the fact that several process steps are required on the other hand. Furthermore, the fastener device can be unnecessarily rigid and therefore uncomfortable, and may even chafe the wearer's skin. However, fastener devices of this type known hitherto have always required a carrier in order to be used and applied to an absorbent article, such as a diaper or an incontinence guard, and to bind together sufficiently strongly to ensure that the loops will not separate from the material as a hook and loop fastener is fastened to the material and then released and refastened at one and the same place or at some other place.

The object of the present invention is to provide a fastener device which is less expensive and more pliable than earlier known devices and the material of which is sufficiently stable for use as a female component to the male component of a hook and loop system.

This object is achieved in accordance with the invention with a fastener device that consists of a nonwoven fabric comprised of a carded fibrous web of functional polymer fibres and binding fibres that are bound together mechanically by needling. Additional binding is effected by partially melting the binder fibres. This results in a relatively dense material that has a sufficiently open structure to enable the male component of a hook and loop system to fasten therein. The fastener device is also sufficiently stable to prevent the fibres from being torn away from the surface as the hook component of the fastener is released. It is also sufficiently stable for the hook component of the fastener to be fastened, released from the fastener device and moved to a new position thereon.

The nonwoven fabric can thus be used instead of the conventional looped female component of a hook and loop fastener system. The nonwoven fabric, however, has no loops. On the other hand, the fastener surface is slightly rugged.

The carded fibre mixture will conveniently comprise 10-25% binding fibres and 75-90% functional fibres. The functional fibres will preferably consist of a mixture of two or more types of fibre, suitably 40-60% of one type and 60-40% of another type.

The functional fibres are either crimped single-component fibres or spiralled bi-component fibres or multi-component fibres of the side-by-side type. There may be used a mixture of several types of crimped fibres, crimped and spiralled fibres, or several types of spiralled fibres. The spiralled fibres may have already be spiralled when preparing the fibre mixture to be carded and needled. It is also possible to use multi-component fibres of the side-by-side type that are spiralled during manufacture of the fastener device, conveniently when applying heat so as to partially melt the binding fibres.

It is also possible to use different polymer materials in the fibres of the inventive fastener device. Polyester fibres and polypropylene fibres are preferred. In bi-component fibres or multi-component fibres there can be used two types of polyester that have mutually different melting and expansion coefficients, or, e.g., polyester as one component and another polymer material, e.g. polypropylene, as other components. The binding fibres may comprise bi-component fibres of polypropylene and polyethylene.

Different types of functional polyester fibres having varying lengths, thicknesses, etc., may be used in the manufacture of the inventive fastener device. A suitable thickness of the functional fibres is 1-6 dn, particularly 1.5-6 dn. When using only one type of fibre, such as polyester type fibres, fibres of two different thicknesses may be mixed together. A suitable length of both binding fibres and functional fibres is 30-80 mm, preferably 40-70 mm and then particularly about 60 mm.

Spiralled fibres may also be included in the mixture, to create a surface structure.

The polyester fibre fabric according to the invention can be used directly as fastener means and glued directly to a diaper for instance, in the absence of an intermediate carrier.

- 5 According to one preferred embodiment of the invention, the polyester nonwoven material includes spiralled fibres. The spiralled fibres that can be used in the inventive fastener device are suitably of the same type as those described in SE 9604833-5. These fibres are comprised of heat-crimped, spiralled, elastic thermoplastic multi-component fibres, preferably bi-component fibres. The components in the fibres are
10 suitably disposed side-by-side. As the fibres are heat-treated the various components shrink to mutually different extents and thereby form the spiralled fibre.

- In accordance with the invention, binding of the material can be further improved by calendering the material, i.e. with the aid of pressure and heat. Smooth-calendering is
15 used in particular on one side of the material.

- The inventive nonwoven fabric will now be described with reference to particular embodiments thereof and also with reference to the accompanying drawings, in which Figs. 1-7 are schematic illustrations of the various steps that are carried out when
20 testing the adhesiveness or holding strength of a hook and loop system; Fig. 8 is a schematic view from above of a diaper in which the inventive nonwoven fabric is used as a tape landing zone system; and Figs. 9 and 10 show parts of a diaper or incontinence guard that include a replaceable absorbent part.

- 25 Manufacture of the inventive fastener device is commenced by forming a nonwoven fabric from binding fibres and functional fibres. These fibres are then bound mechanically, suitably by needling, until there is obtained a relatively dense material that has a structure which is sufficiently open for the male component of a hook and
30 loop fastener system to fasten therein and which is sufficiently stable to prevent an excessive number of fibres being loosened from the fastener device as the male

component of said device is pulled away. Needling imparts to the material a slightly rugged surface that functions as a fastening surface. The material is then generally equilateral. The material is then heated so as to partially melt the binding fibres and to hold the fastener device together. Any multi-component fibres of the side-by-side type present will be spiralled in this heating process. As the fibres spiral, the needled nonwoven fabric will shrink to some extent and the ruggedness of the surface increase. One side of the material is then suitably smooth calendered. The smooth surface of the material thus obtained facilitates gluing of said surface to an article. This smooth calendering of said surface shall not be confused with the heat smelting process described in, e.g., EP-A1-0 780 505 for forming a carrier surface.

It is necessary to establish the extent to which needling shall be carried out, by experimenting with the material produced. In addition to a subjective assessment of the density of the material, its adhesiveness, and integrity, the shear force and peeling force required to release the fastener device from a hook-carrying part of the device can be measured in accordance with the following.

In the following description of the tests carried out, the female and male components of the hook and loop fastener systems are referred to as loop components and hook components respectively, regardless of whether these fastener parts present respectively loops and hooks as in a typical loop and hook fastener system or whether they lack the presence of loops, for instance, such as in the case of the inventive nonwoven fabric that includes a fastener surface.

DESCRIPTION OF EMBODIMENTS

Tests were carried out with the following mixtures.

5

PARAMETERS	Test 1, 08-370	Test 2, 08-378	Test 3, 08-379
Binding fibers %	15 % 4 dn bico	20 % 2 dn bico	20 % 2 dn bico
Supplier	UNITIKA	HOECHST	HOECHST
Type	Melty 4080	Trevira T 254	Trevira T 254
Functional fibres	50 % 3 dn	40 % 3 dn	40 % 6dn conj.hollow
Supplier	HOECHST	HOECHST	NAN YA
Type	Trevira T 290	Trevira T 290	
Functional fibres	35 % 1,5 dn	40 % 3 dn spiral	40 % 3 dn spiral
Supplier	HOECHST	RHONE-POULENC	RHONE-POULENC
Type	Trevira T 290	Tergal X443	Tergal X403

Tergal X443 and Tergal 403 are bi-component fibres of the side-by-side type that spiral when heated. The two components are comprised of two types of polyester that have mutually different melting points. NAN YA is a fibre that has already been spiralled and which also comprises bi-component polyester of the side-by-side type.

10 All of the binding fibres are of the kind that includes a polyester core and a co-polyester casing.

As will be seen, two crimped polyester fibres of mutually different thickness were used in Test 1. In Test 2, there was used a crimped polyester fibre in mixture with a bi-component fibre that spiralled when heated. In Test 3, there was used a polyester fibre that had already spiralled in mixture with a bi-component fibre that spiralled when heated. A bi-component fibre of the type that includes a core which melts at high temperature and a casing which melts at low temperature were used as binding fibre in

15

all tests. The material was heated until the binding fibre casing melted, but was stopped before the core melted.

<u>Samples</u>	<u>Description</u>
5 EKL, loop material	Standard knitted polyester fabric coated with polypropylene, weight per unit area 90g/m ² (PET 47.5, PP 42.5 g/m ²)
08-370 K	Smooth calendered, long hotmelt fibres
10 08-378, thick fibres	Side-by-side fibres that shrink and spiral in-line
08-379, fine fibres	Side-by-side fibres that shrink and spiral in-line

15 **DETERMINING THE SHEAR FORCE OF A HOOK AND LOOP FASTENER SYSTEM**

Principle

- 20 The hook material and the loop material are joined together in a controlled fashion. The shear force is then measured with a tensile testing device.

Sample preparation

- 25 ▪ Choose sample combination according to Fig. 1. MD denotes machine direction and CD denotes cross direction.
- Punch out the loop samples, 50 x 60 mm and mark with a pen according to Figs. 2A, B. Fig. 2A shows a roll of loop material 1 and Fig. 2B shows a role of hook material 2.
- 30 ▪ Cut out the hook samples, 25 x 80 mm, and mark with an asterisk and arrow respectively, to show respective directions on the sample.

- Make a mark 30 mm in from the edge of the hook sample in accordance with Fig. 3A. The CD-directions shall be tested primarily.

Procedure

- 5
 - Place the hook sample 2 carefully over the loop sample 1. The contact surface shall measure 30 x 25 mm. See Fig. 3A.

Place the hook and loop sample 2 and 1 respectively in the roll apparatus and allow the pressure roll 3 to roll forwards and backwards one time (one cycle); see Fig. 4.
- Place the whole of the sample in the tensile testing device 4 with the hook material

2 in the upper clamp 5 and the loop material 1 in the lower clamp 6, as shown in Fig. 5. The materials are pulled in the direction of the arrow F.

- Continue with the test until the materials are fully "delaminated".

Calculations and results

15

T_{\max}	=	Shear force, N/cm ²
F_{\max}	=	The highest force detected during "delamination", N
l	=	The length of the contact surface, mm
b	=	The width of the contact surface, mm
20 T_{\max}	=	$\frac{F_{\max} \times 100}{l \times b}$

DETERMINING THE DELAMINATING FORCE OF A HOOK AND LOOP FASTENER SYSTEM

Principle

5

The hook material and the loop material are joined together in a controlled fashion. The delaminating force is then determined with the aid of a tensile testing device with the material at 90°.

10 Sample preparation

- Select a sample combination according to Fig. 1.
 - Punch out the loop samples 1, 50 x 60 mm, and mark with a pen according to Fig. 2A.
 - Clip/cut out the hook samples 2, 25 x 80 mm, and mark with a star and an arrow respectively, so as to show respective directions on the sample according to Fig. 2B.
 - Make a mark 30 mm from one edge of the hook sample 2 - see Fig. 3B.
- The CD directions shall be tested primarily.

15

20 Procedure

- Place over the hook sample 2 a piece of tape 7 which is sufficiently large to leave free a surface measuring 25 x 30 mm.
- Place the hook sample 2 over the loop sample 1. Leave 10 mm of the loop strip 3 for fastening the strip in the clamp; see Fig. 3B.
- Place the hook sample 2 + the loop sample 1 in the roll apparatus and allow the pressure roll 3 to roll forwards and backwards one time (one cycle) - see Fig. 4. Begin to roll in the direction shown in the Figure.
- In order to generate a defined shear force, place the outwardly projecting part of the loop material 1 in a clamp 8 and the outwardly projecting part of the hook material in a clamp 9, with a weight of 1 kg.
- Allow the weight to hang freely for 10 seconds; see Fig. 6.

25

30

- Place the sample in the tensile testing device 4 with the hook component 2 in the upper clamp 5 and the loop component in the lower clamp 6.
- Carry out the test on the two materials at an opening angle of 180° ; see Fig. 7.
- The delaminating force can also be determined with repeated opening and closing of the two components if so desired. This can only be done if no deformation occurs in the material during the test.

Calculation and results

The method measures the highest peaks (max. 20) during the test.

10	F_{\max} N/25 mm	=	The highest peak during the test
	F_{med} N/25 mm	=	The mean value of all peaks during the test

In the described tests, the shear force with respect to the loop material will preferably lie between 40 and 100 N/7.5 cm² and the delaminating force between 2 and 5 N/25 mm (mean load) and between 3 and 8 N/25 mm (peak load) respectively. Excessively high values mean that it is difficult to loosen the hook and loop components from one another without tearing said components or without removing a component from the underlying backing sheet, whilst excessively low values indicate insufficient fastening ability or holding strength. It will be seen from the following that the inventive material has the properties desired and surpasses the reference material EKL in several respects.

The results are shown in Table 2 below.

Table 2

Fastener Device	Weight per unit area g/m ²	Shear force, N/7.5 cm ² Peak load, C:3			Delaminating force, N/25 mm Mean load, C:3			Delaminating force, N/25 mm Peak load, C:3		
		Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
EKL	90	70			3.5			5.5		
08-370K	60	82	89	75	3	4	3	5	6	4
	80	92	101	80	3.5	4	3	5.5	6.5	4.5
	100	47	57	21	2.5	3	2	4	6.5	3
08-378	80	73	77	68	4	5	3	6	7	5
08-379	80	43	48	40	2	2	1.2	3	4	2

The best shear force result was obtained with sample 08-370K, followed by 08-378, although this latter gave a somewhat higher delaminating force.

All tests were carried out with standard hook C200 from 3M.

Fig. 8 is a schematic illustration of a diaper with which the inventive fastener material can be used. The diaper includes an absorbent sheet which is disposed between a liquid-permeable inner sheet that lies proximal to a wearer in use and a liquid impermeable outer sheet, or backing sheet, which lies distal from the wearer in use. The diaper has a generally rectangular shape and is delimited by two short sides 10, 11 and two long sides 12, 13. Two fastener tapes that include hook material 2 are fastened to the outside of the diaper, at one short end 10, such that a free part of each fastener tape forms an extension of said short side, wherewith the hook material faces in the same direction as the inside surface of the diaper. Loop material 1 according to the invention is fastened to the outside of the diaper at the other short end 11, in each corner thereof. When placing the diaper on a wearer, the centre part of the diaper is curved around the wearer's crotch, so that the short sides 10, 11 will lie around the wearer's waist. The diaper is fastened by applying the tapes that include hook material 2 to the tapes that include loop material 1. By way of alternative, a strip of loop material can be placed along the full length of the short side, instead of using two pieces of loop material along the length of the short side 11. This is shown by a broken line in Fig. 8.

The inventive nonwoven fabric may also be used in the type of diaper or incontinence guard described in US-A-5,549,593, for instance. This type of diaper is illustrated in Figs. 9 and 10 and includes an absorbent part 14, the actual diaper, which is replaceable and secured to a belt 15 around the wearer's waist. The absorbent part 14 includes an absorbent layer disposed between a liquid-permeable inner sheet, or top sheet, which lies proximal to the wearer in use, and a liquid-impermeable outer sheet, or backing sheet, which lies distal from the wearer in use. Two strips of hook material 2 are disposed along each short side 10, 11 of the absorbent part 14, on the outer side thereof. A nonwoven fabric 1 that includes an inventive fastener surface in the form of loop material is provided on the inside of the belt 15. The short ends 10, 11 of the absorbent part 14 can be inserted in beneath the belt, wherewith the hook material 2 extending along the outer edges of the absorbent part coacts with the loop material 1

on the inside of the belt 15 to secure the diaper to the wearer. Alternatively, the loop material 1 may be provided on the absorbent part 14 and the hook material 2 on the belt 15. Another variant is to provide a fastener surface (either the male or female component) on the outside of the belt 15, and to provide the strip that carries either
5 hook material or loop material on the inside of the absorbent body 14, i.e. on that side of said body that shall face towards the wearer in use. That part of the hook and loop fastener system provided on the belt 15 may either be a continuous strip, as shown in Fig. 10, or comprise several smaller pieces.

- 10 It will be understood that the uses described above have been given only by way of example and in no way limit the scope of the invention. The inventive fastener device can be used in all cases where a hook and loop fastener system that includes a male and female component is used.

CLAIMS

1. Nonwoven fabric that includes a surface for fastening the male component of a hook and loop fastener system which comprises a carded and needled fabric of functional fibres and binding fibres, where the functional fibres are comprised of thermoplastic polymer fibres, and where the nonwoven fabric is bonded by partially melting the binding fibres.
2. A nonwoven fabric according to Claim 1, **characterised** in that the functional fibres are comprised of one or more types of polyester fibres and/or polypropylene fibres.
3. A nonwoven fabric according to Claim 2, **characterised** in that the fabric includes two types of functional polyester fibres of mutually different thickness.
4. A nonwoven fabric according to any one of Claims 1-3, **characterised** in that the functional fibres include spiralled bi-component fibres or multi-component fibres of the side-by-side type.
5. A nonwoven fabric according to Claim 4, **characterised** in that the functional fibres include both crimped polyester fibres and spiralled fibres.
6. A nonwoven fabric according to any one of Claims 1-5, **characterised** in that the fabric contains 10-25% by weight binding fibres and 75-90% by weight functional fibres.
7. A nonwoven fabric according to any one of Claims 1-6, **characterised** in that 40-60% by weight of the functional fibres are spiralled fibres.
8. A nonwoven fabric according to any one of Claims 1-7, **characterised** in that the binding fibres comprise bi-component fibres that include a core and an outer

casing, where the outer casing component has a lower melting point than the inner core component.

9. A method of producing a nonwoven fabric that has a fastener surface according to Claim 1, **characterised** by carding a mixture of binding fibres and functional fibres to form a fibrous web; needling the fibrous web to obtain a dense material that has a structure suitable for the male component of a hook and loop fastener to fasten thereto; and heating the needled fibrous web so as to partially melt the binding fibres.

10. A method according to Claim 9, **characterised** by smooth calendering the needled and heated fibrous web so that one surface thereof will be smooth.

11. A method according to Claim 9 or 10, **characterised** in that the binding fibres are comprised of bi-component fibres that include a core and a casing, where said casing has a lower melting point than the core; and heating the needled fibrous web so that the casings of respective binding fibres will melt while the core remains solid.

12. An absorbent article (14), such as a diaper or incontinence guard, which includes a substantially liquid-impermeable backing sheet and a hook and loop fastener system that includes a female component and a male component attached to said backing sheet for mutual coaction such as to secure the article in position on a wearer, **characterised** in that the female component (1) of the system is comprised of nonwoven fabric according to any one of Claims 1-8.

13. An article according to Claim 12, **characterised** in that the article includes an absorbent body enclosed between a liquid-permeable inner sheet that lies proximal to the wearer in use and said substantially liquid-impermeable backing sheet that lies distal from the wearer in use, said backing sheet being delimited by two short sides (10, 11) and two long sides (12, 13), wherein two male-component tabs (2)

belonging to said fastener system are fastened to said backing sheet on each long side (12, 13) thereof close to one short side (10), so as to form an extension of the short side with the male component facing in the same direction as the inner sheet; and in that the female component (1) is provided on the backing sheet at the other short side (11).

14. An article according to Claim 13, **characterised** in that one female component piece (1) is provided in each corner of said second short side (11).

15. An article according to Claim 13, **characterised** in that the female component (1) is comprised of a strip that extends essentially along the full length of the second short side (11).

16. An article according to Claim 12, **characterised** in that said article includes two parts, a belt (15) which is intended to be fastened around the waist of a wearer, and an absorbent part (14) which, in use, is fastened to the belt by means of mutually coacting male and female components (1, 2) of the hook and loop fastener system and which includes an absorbent body enclosed between a liquid-permeable inner sheet intended to lie proximal to the wearer in use and said substantially liquid-impermeable backing sheet intended to lie distal from the wearer in use and delimited by two short sides (10, 11) and two long sides (12, 13), wherein the mutually coacting components (1, 2) are disposed along the short sides (10, 11) of said absorbent body and on said belt (15) respectively.

17. An article according to Claim 16, **characterised** in that the female component (1) is disposed on the inner surface of the belt (15) and the male component (2) is disposed on the outer surface of the absorbent body (14).

18. An article according to Claim 16, **characterised** in that the male component (2) is disposed on the inner surface of the belt (15) and the female component (1) is disposed on the outer surface of the absorbent body (14).

19. An article according to Claim 16, **characterised** in that the male component (2) is disposed on the outer surface of the belt (15) and the female component (1) is disposed on the inner surface of the absorbent body (14).

5

20. An article according to Claim 16, **characterised** in that the female component (1) is disposed on the outer surface of the belt (15) and the male component (2) is disposed on the inner surface of the absorbent body (14).

10 21. The use of a nonwoven fabric that includes a fastener surface according to any of claims 1-8, which comprises a carded and needled fibrous web of functional fibres and binding fibres, where the functional fibres are comprised of thermoplastic polymer fibres, and where the nonwoven fabric is bonded by partially melting the binding fibres, as the female component in a hook and loop fastener system in an
15 absorbent article (14), such as a diaper or incontinence guard, which includes a substantially liquid-impermeable backing sheet and a hook and loop fastener system that includes a female component and a male component attached to said backing sheet for mutual coaction such as to secure the article in position on a wearer.

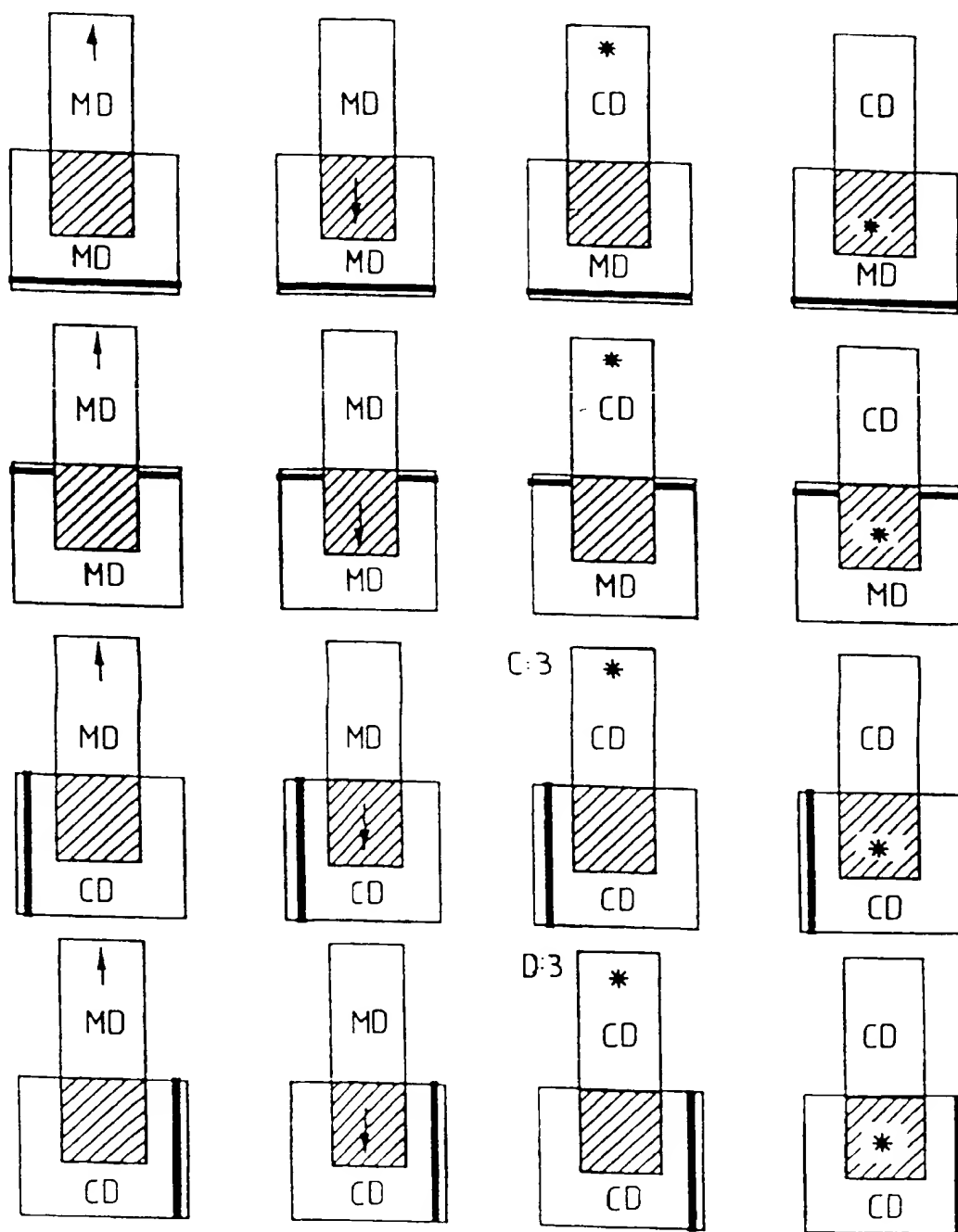


FIG.1

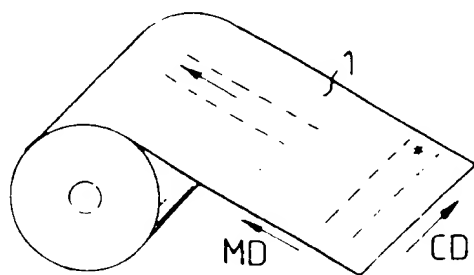


FIG. 2A

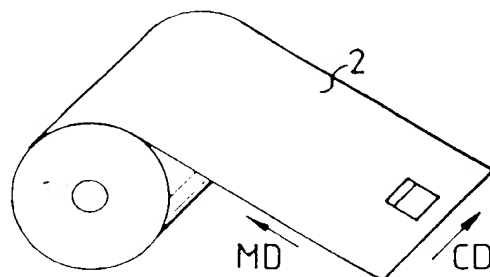


FIG. 2B

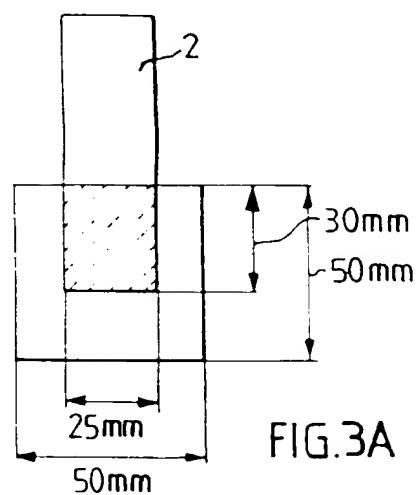


FIG. 3A

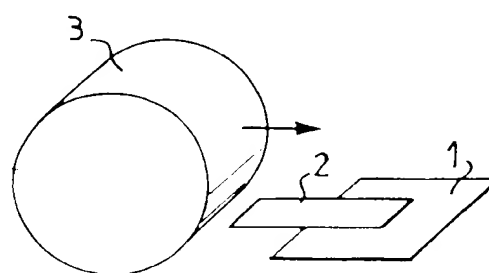


FIG. 4

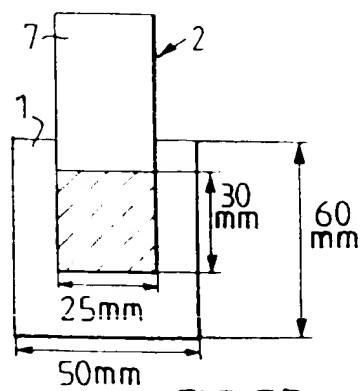


FIG. 3B

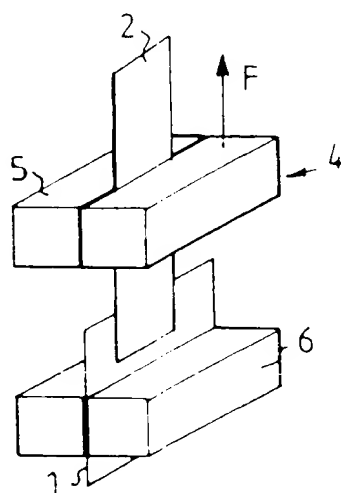


FIG. 5

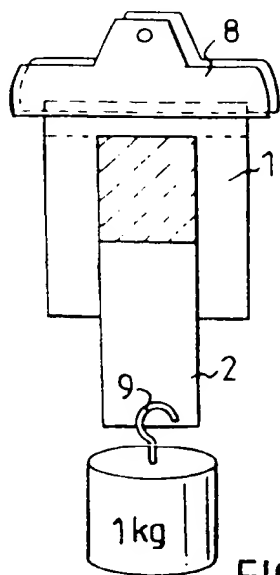


FIG. 6

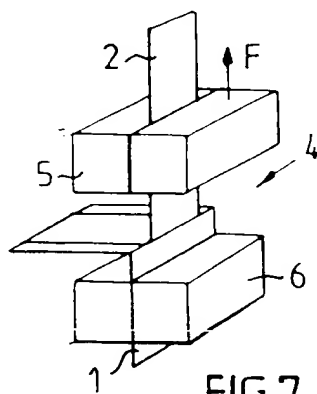


FIG. 7

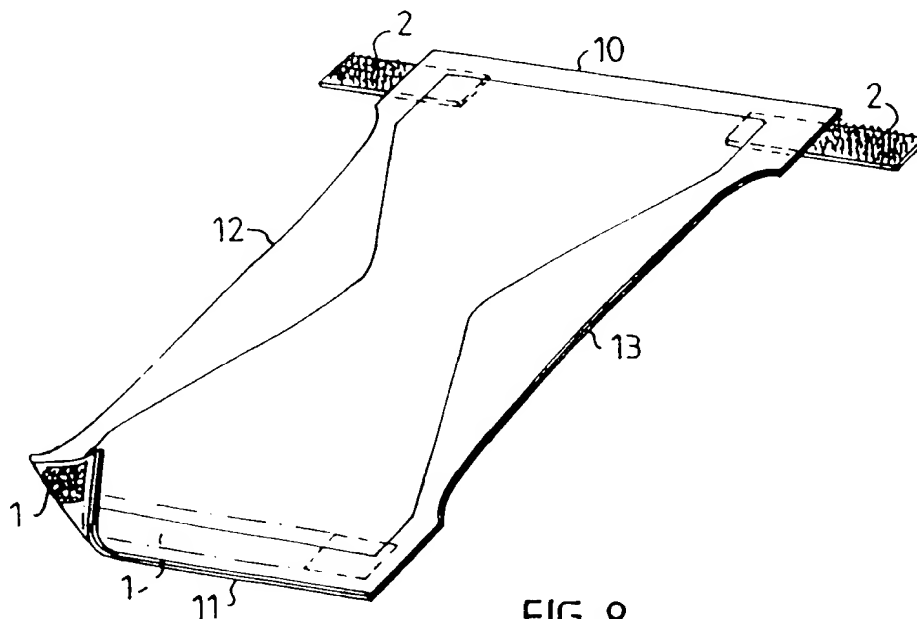
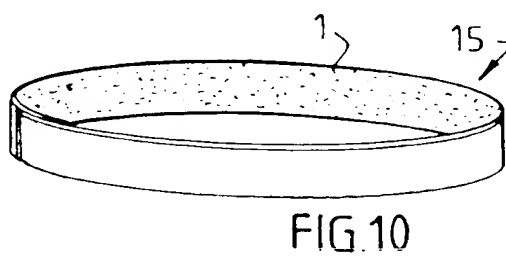
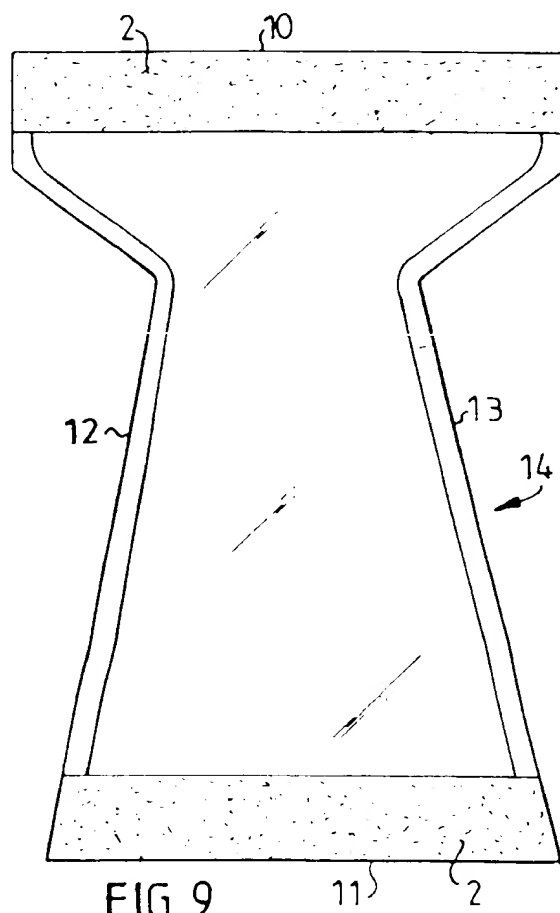


FIG. 8



REQUEST

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PCI: 524,0153

19 -11- 1999

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Box No. V DESIGNATION OF STATES

The following designations are hereby made under Rule 4 9(a) *(mark the applicable check-boxes, at least one must be marked)*:

Regional Patent

- ☒ **AP** **ARIPO Patent:** **GH** Ghana, **GM** Gambia, **KE** Kenya, **LS** Lesotho, **MW** Malawi, **SD** Sudan, **SL** Sierra Leone, **SZ** Swaziland, **UG** Uganda, **ZW** Zimbabwe, and any other State which is a Contracting state of the Harare Protocol and of the PCT
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- ☒ **OA** **OAPI Patent:** **BF** Burkina Faso, **BJ** Benin, **CF** Central African Republic, **CG** Congo, **CI** Côte d'Ivoire, **CM** Cameroon, **GA** Gabon, **GN** Guinea, **GW** Guinea-Bissau, **ML** Mali, **MR** Mauritania, **NE** Niger, **SN** Senegal, **TD** Chad, **TG** Togo, and any other State which is member State of OAPI and a Contracting State of the PCT *(if other kind of protection or treatment desired, specify on dotted line)*.....

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Precautionary Designation Statement: In addition to the designations made above, the applicant also makes under Rule 4 9(b) all other designations which would be permitted under the PCT except any designation(s) indicated in the Supplemental Box as being excluded from the scope of this statement. The applicant declares that those additional designations are subject to confirmation and that any designation which is not confirmed before the expiration of 15 months from the priority date is to be regarded as withdrawn by the applicant at the expiration of that time limit. *(Confirmation of a designation consists of the filing of a notice specifying that designation and the payment of the designation and confirmation fees. Confirmation must reach the receiving office within the 15-month time limit.)*


Box No. VI PRIORITY CLAIM		<input type="checkbox"/> Further priority claims are indicated in the Supplemental Box		
Filing date of earlier application (day month year)	Number of earlier application	Where earlier application is		
		national application: country:	regional application* regional Office	international application receiving Office
item (1) 19 November 1998 (19.11.98)	9803970-4	SE		
item (2)				
item (3)				

☒ The receiving Office is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) (only if the earlier application was filed with the Office which for the purposes of the present international application is the receiving Office) identified above as item(s): 1

* Where the earlier application is an ARIPO application, it is mandatory to indicate in the Supplemental Box at least one country party to the Paris convention for the Protection of Industrial Property for which that earlier application was filed (Rule 4.10(b)(ii)). See supplemental Box.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY	
Choice of International Searching Authority (ISA) (If two or more international Searching Authorities are competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used): ISA /SE	Request to use results of earlier search; reference to that search (if an earlier search has been carried out by or requested from the International Searching Authority): Date (day month year): 31 May 1999 Number: SE98/01291 Country (or regional Office): SE

Box No. VIII CHECK LIST; LANGUAGE OF FILING	
This international application contains the following number of sheets : request: 3 ✓ description (excluding sequence listing part): 13 ✓ claims: 4 ✓ abstract: 1 ✓ drawings: 4 ✓ sequence listing part of description: _____ Total number of sheets: 25 ✓	This international application is accompanied by the item(s) marked below: 1. <input checked="" type="checkbox"/> fee calculation sheet 2. <input checked="" type="checkbox"/> separate signed power of attorney (2) 3. <input type="checkbox"/> copy of general power of attorney; reference number, if any: 4. <input type="checkbox"/> statement explaining lack of signature 5. <input type="checkbox"/> priority document(s) identified in Box No. VI as item(s): 6. <input type="checkbox"/> translation of international application into (language): 7. <input type="checkbox"/> separate indications concerning deposited microorganism or other biological material 8. <input type="checkbox"/> nucleotide and/or amino acid sequence listing in computer readable form 9. <input checked="" type="checkbox"/> other (specify): SE98/01291
Figure of the drawings which should accompany the abstract: 8	Language of filing of the international application: Swedish

Box No. IX SIGNATURE OR APPLICANT OR AGENT	
Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).	
 Karin U. Larsson 19 november 1999	

1 Date of actual receipt of the purported international application: 19-11-1999	For receiving Office use only	2 Drawings: <input checked="" type="checkbox"/> received <input type="checkbox"/> not received
3 Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:		
4 Date of timely receipt of the required corrections under PCT-Article 11(2):		
5 International Searching Authority (if two or more are competent): ISA/SE	6 <input type="checkbox"/> Transmittal of search copy delayed until search fee is paid	

Date of receipt of the record copy by the International Bureau: 20 JANUARY 2000	For International Bureau use only (20.01.00)
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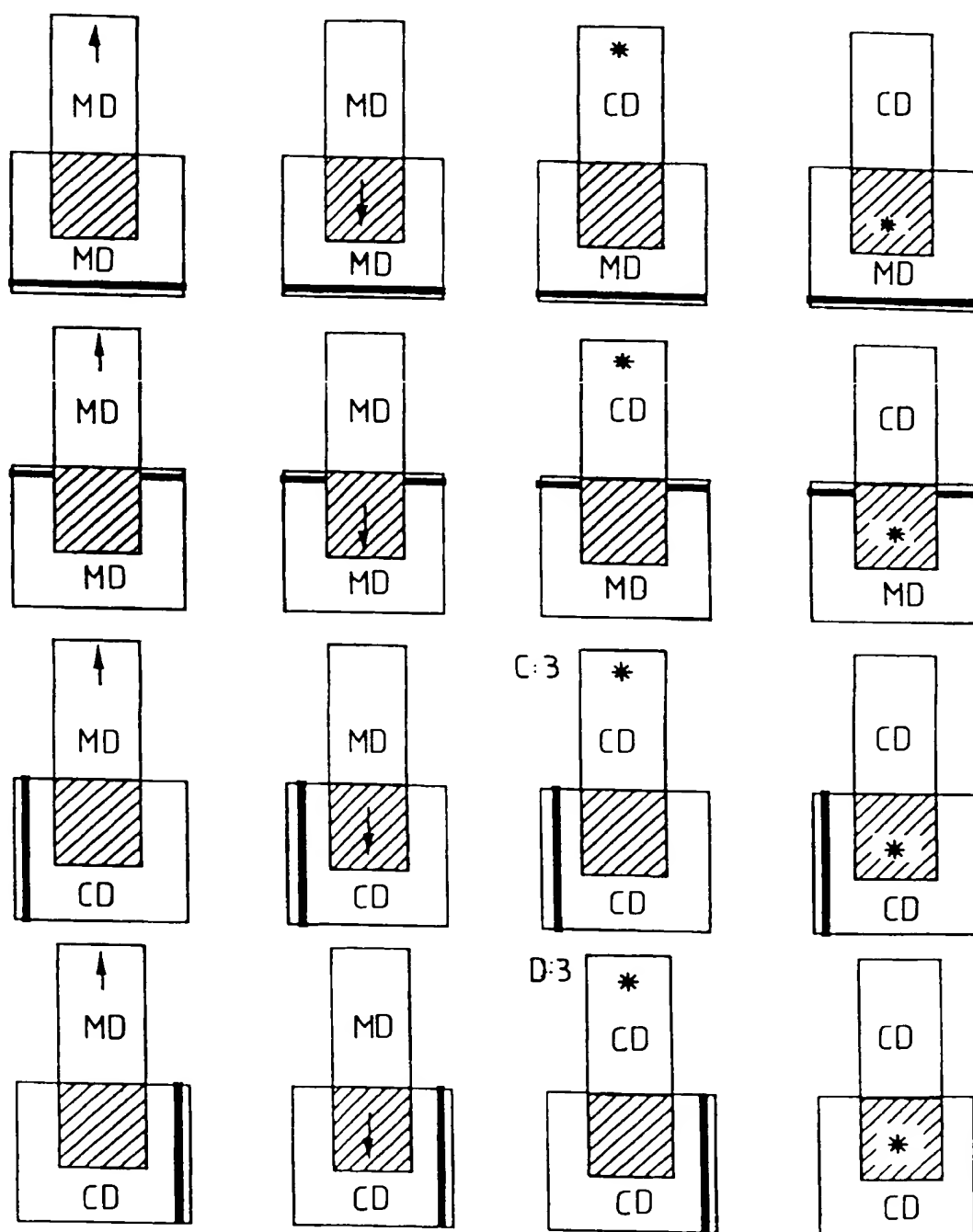


FIG.1

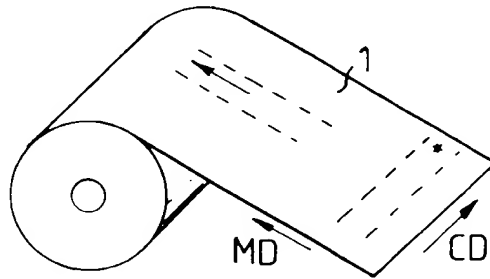


FIG. 2A

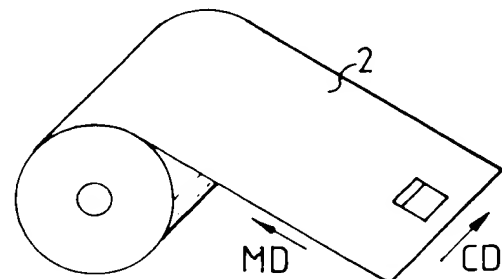


FIG. 2B

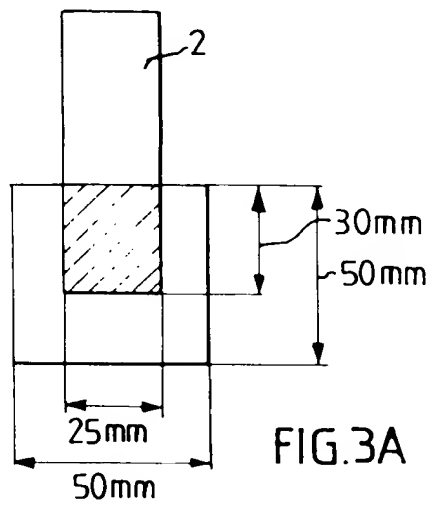


FIG. 3A

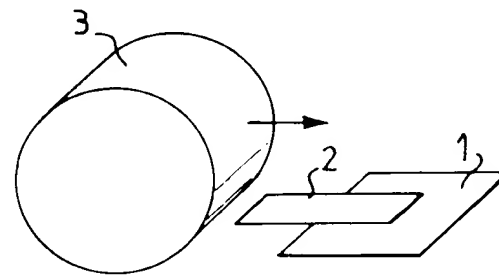


FIG. 4

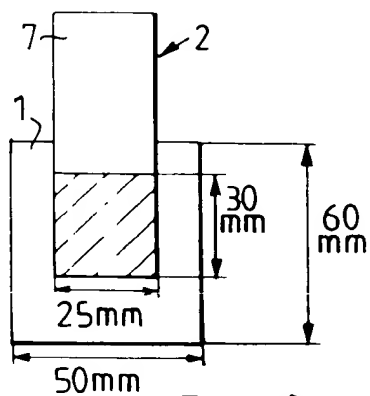


FIG. 3B

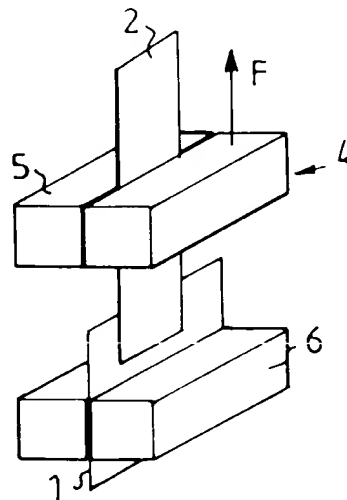


FIG. 5

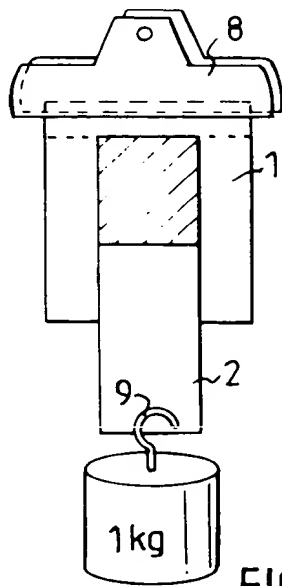


FIG. 6

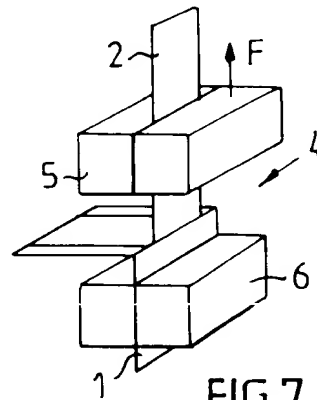


FIG. 7

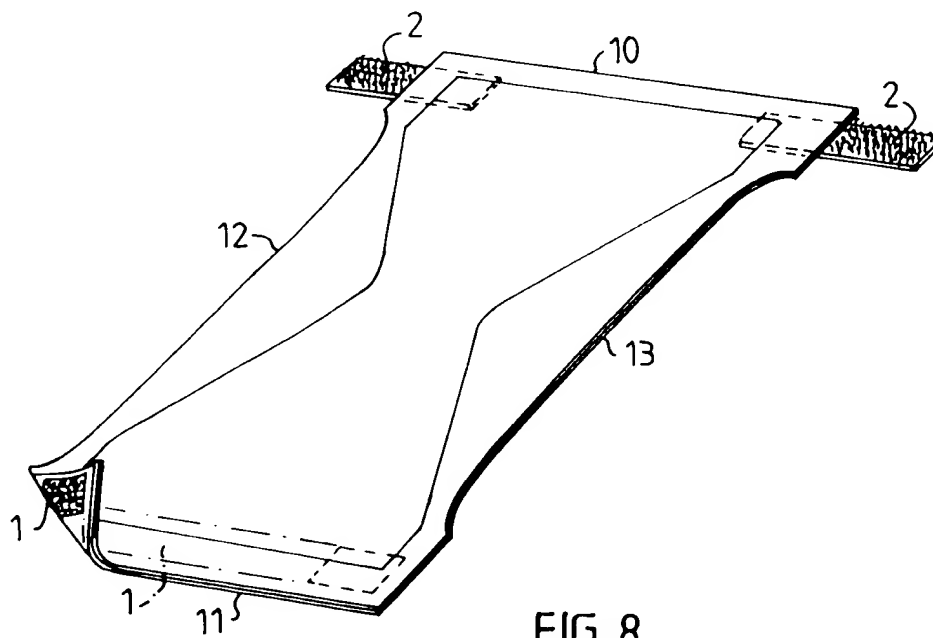
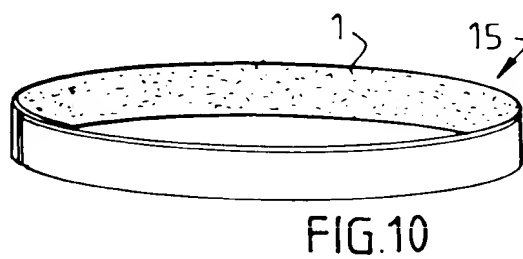
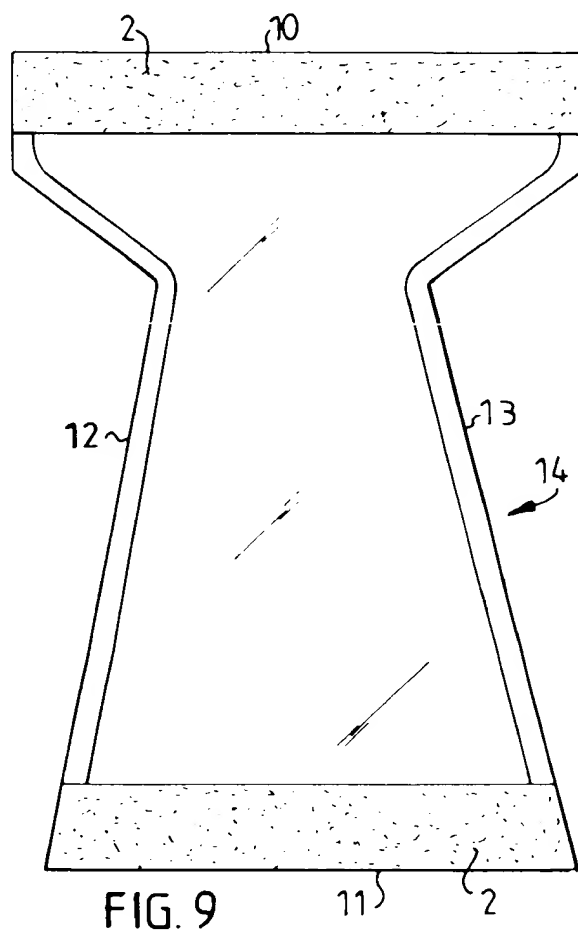


FIG. 8



SCA HYGIENE PRODUCTS AB

Fästorgan

5

Föreliggande uppfinning hänför sig till ett material som kan fungera som fästyta för handelen i ett kardborresystem, till ett förfarande för framställning av detta material, till ett absorberande alster, såsom en blöja, där materialet användes som fästorgan, samt till användning av detta material som hondel i ett kardborresystem i ett

10 absorberande alster.

I t ex absorberande alster, såsom blöjor och inkontinensskydd, användes ofta fästorgan av typen kardborresystem för att hålla fast alstret på användaren. Dessa fästorgan består av en han- och en hondel, där den första är uppbyggd av hakar och
15 den senare av öglor. Dessa två delar kan fästas mot varandra och därefter lösgöras från varandra.

Fästorganen består av öglor resp hakar bildade på ena sidan av ett fiberband som är bundet till en bandformig bärare. Bäraren är lämpligen självhäftande på motsatt yta
20 så att bandet lätt kan fästas på ett alster.

Den beskrivna tvåskiktssuppbbyggnaden med en bärare är nödvändig för att fästorganet skall bli tillräckligt starkt och kunna fästas på en absorptionskropp, t ex genom limning.

25

Kända bandformiga öglematerial bildas t ex genom att ett fiberflor med öglor limmas på en bärarbana, genom att öglor från ett fiberflor genom nålning dras genom en bärarbana eller genom att ett fiberflor med öglor, där fibrerna omfattar varmsmält-bara fibrer, smältes på ena ytan så att en sammanhängande bäraryta

bildas. Sådana material finns beskrivna i exempelvis EP-A2-0780505, WO96/04812, WO95/33390, WO92/20251, US-A-3694867, EP-A2-0258015, WO95/17111 och EP-A1-0765616.

- 5 Nackdelen med dessa fästorgan är att laminatuppbyggnaden ej är kostnadseffektiv, både pga materialåtgången och pga att flera förfarandesteg erfordras. Dessutom kan fästorganet bli onödigt stelt och därför obekvämt, eventuellt även förorsaka skavsår. Hittillsvarande fästorgan av denna typ har emellertid alltid erfordrat en bärare för att kunna användas och appliceras på ett absorberande alster av typen blöja eller
- 10 inkontinensskydd och för att hålla ihop tillräckligt väl så att öglor ej lossar från materialet då en kardborre fästes därvid och därefter lösgöres för att på nytt kunna sättas fast på samma eller annan plats på fästorganet.

- Ändamålet med föreliggande uppfinning är att åstadkomma ett billigare och
- 15 smidigare fästorgan, vilket material samtidigt är tillräckligt stabilt för att kunna utnyttjas som handel till handelen i ett kardborresystem.

- Detta åstadkommes enligt uppfinningen genom ett fästorgan bestående av en fiberduk av ett kardat flor av funktionella polymerfibrer och bindefibrer som binds
- 20 mekaniskt medelst nålning. Ytterligare bindning sker genom delvis smältning av bindefibrerna. På detta sätt erhålles ett relativt tätt material, som har tillräckligt öppen struktur för att en kardborre, dvs handelen till ett kardborresystem, skall kunna fästa därvid. Dessutom är föreliggande fästorgan tillräckligt stabilt för att fibrena ej skall slitas loss från ytan då kardborren lossas därifrån. Vidare är det
- 25 tillräckligt stabilt för att en kardborre skall kunna fästas däremot, lossas från fästorganet och flyttas till ett nytt läge på fästorganet.

Föreliggande fiberduk kan således användas i stället för den vanligen ögelförsedda hondelen i ett kardborresystem. Fiberduken uppvisar emellertid inga öglor. Däremot är fästytan något knottig.

- 5 Lämpligen består den kardade fiberblandningen av 10-25 % bindefibrer och 75-90 % funktionella fibrer. De funktionella fibrerna består företrädesvis av en blandning av två eller flera fibertyper, lämpligen 40-60 % av en typ och 60-40 % av en annan typ av fibrer. De funktionella fibrerna är antingen krusade (crimped) enkomponentfibrer eller spiraliserade två- eller flerkomponentfibrer av sida-vid-
10 sida-typ. En blandning av flera typer av krusade fibrer, av krusade och spiraliserade fibrer eller av flera typer av spiraliserade fibrer kan användas. De spiraliserade fibrerna kan vara färdigspiraliserade vid bildning av fiberblandningen som skall kardas och nålas. Det är även möjligt att använda flerkomponentfibrer av typen sida-vid-sida som spiraliseras under framställning av fästorganet, lämpligen vid
15 värmningen för delvis smältning av bindefibrerna.

- Det är möjligt att använda olika polymermaterial i fibrerna i föreliggande fästorgan. Polyesterfibrer och polypropenfibrer föredrages. I bi- eller flerkomponentfibrerna kan användas två typer av polyester med olika smält- resp. utvidgningskoefficient
20 eller tex polyester som en komponent och ett annat polymermaterial som andra komponent, tex polypropen. Binfibrerna kan tex utgöras av bikomponentfibrer av polypropen och polyeten.

- Vid åstadkommande av fästorganet enligt uppfinningen är det möjligt att använda
25 olika typer av funktionella polyesterfibrer med varierande längd, tjocklek, osv. Lämplig tjocklek är för de funktionella fibrerna 1-6 dn, speciellt 1,5-6 dn. Vid användning av endast en typ av fibrer, såsom en typ av polyesterfibrer, kan lämpligen två grovlekar av denna fiber blandas. Lämplig fiberlängd för både

bindefibrer och funktionella fibrer är 30-80 mm, företrädesvis 40-70 mm och speciellt då ca 60 mm.

Dessutom kan spiralformade fibrer blandas in för att skapa ytstruktur.

5

Polyesterfiberduken enligt uppfinningen kan användas direkt som fästorgan och limmas direkt på en blöja t ex, utan någon mellanliggande bärare.

Enligt en föredragen utföringsform av uppfinningen omfattar polyesterfiberduken spiralformade fibrer. De spiralformade fibrerna som kan användas i föreliggande fästorgan är lämpligen av samma typ som beskrives i SE 9604833-5. Dessa fibrer utgöres av värmekrympta, spiraliserade, elastiska termoplastiska flerkomponentfibrer, företrädesvis bikomponentfibrer. Komponenterna i fibrerna är lämpligen anordnade sida-vid-sida. Vid värmebehandling av fibrerna krymper de olika komponenterna olika mycket och därigenom bildas den spiraliserade fibern.

15

Materialet enligt uppfinningen kan bindas samman ytterligare med hjälp av kalandrering, dvs med hjälp av tryck och värme. Speciellt användes slätkalandrering av ena sidan.

20

I det följande beskrives fiberduken enligt uppfinningen närmare med hänvisning till speciella utföringsformer och till bifogade ritningar, där Fig. 1-7 schematiskt visar olika steg vid provning av ett kardborresystems fästförmåga,

25

Fig. 8 visar en schematisk vy uppifrån av en blöja där föreliggande fiberduk utnyttjas som tape landing zone system och Fig. 9 och 10 visar delarna i en blöja eller inkontinensskydd med utbyttbar absorptionsdel.

Vid framställning av fästorganet enligt uppfinningen bildas först ett flor av bindefibrer och funktionella fibrer. Dessa bindes därefter mekaniskt, lämpligen genom nålning, tills ett relativt tätt material erhålles, som har tillräckligt öppen struktur för att handelen till ett kardborresystem skall kunna fästa därvid och som är

5 tillräckligt stabilt för att ej alltför mycket fibrer skall lossa från fästorganet då kardborren lossas därifrån. Vid nålningen erhåller materialet en något knottrig yta, som fungerar som fästyta. Materialet är då väsentligen liksidigt. Materialet uppvärms därefter för att bindefiberna skall smälta delvis och hålla samman fästorganet. Vid denna uppvärmning spiraliserar samtidigt eventuella ingående

10 flerkomponentfibrer av typen sida-vid-sida. Då fibrerna spiraliserar sker samtidigt en viss krympning av det nålade floret och knottrigheten på ytan ökar. Därefter slätkalandreras lämpligen materialets ena sida. Den erhållna släta sidan kan lättare limmas vid ett alster. Denna slätkalandring skall ej sammanblandas med den varmsmältning för att bilda en bäraryta som beskrives i tex EP-A1-0 780 505.

15

Nålningsgraden måste provas fram genom provning av det framställda materialet. Förutom en subjektiv bedömning av materialets täthet, fästförmåga, integritet, kan fästorganets skjuvningskraft och delamineringskraft vid lösgörande från en kardborre mätas enligt följande.

20

I beskrivningen av provningarna betecknas de undersökta kardborresystemens hon- och handelar ögledelar resp. hakdelar, oberoende av om de som i ett normalt kardborresystem uppvisar öglor och hakar eller om de ej uppvisar tex öglor såsom föreliggande fiberduk med fästyta.

25

Utföringsexempel

Prov med följande blandningar har utförts.

PARAMETRAR	Prov 1, 08-370	Prov 2, 08-378	Prov 3, 08-379
Bindefibrer %	15 % 4 dn bico	20 % 2 dn bico	20 % 2 dn bico
Leverantör	UNITIKA	HOECHST	HOECHST
Typ	Melty 4080	Trevira T 254	Trevira T 254
Funktionella fibrer	50 % 3 dn	40 % 3 dn	40 % 6dn conj.hollow
Leverantör	HOECHST	HOECHST	NAN YA
Typ	Trevira T 290	Trevira T 290	
Funktionella fibrer	35 % 1,5 dn	40 % 3 dn spiral	40 % 3 dn spiral
Leverantör	HOECHST	RHONE-POULENC	RHONE-POULENC
Typ	Trevira T 290	Tergal X443	Tergal X403

Tergal X443 och Tergal X403 är bikomponentfibrer av sida-vid-sida-typ som spiraliseras vid uppvärmning. De två komponenterna utgöres av två polyestertyper med olika smältpunkt. NAN YA är en färdigspiraliserad fiber, likaledes av bikomponentpolyester av sida-vid-sidatyp. Bindefibrerna är alla av typen med kärna av polyester och hölje av sampolyester.

I Prov 1 användes således två krusade polyesterfibrer med olika grovlek. I Prov 2 användes en krusad polyesterfiber i blandning med en bikomponentfiber, som spiraliseras vid upphettning. I Prov 3 användes en färdigspiraliserad polyesterfiber i blandning med en bikomponentfiber som spiraliseras vid upphettning. I alla proverna användes en bikomponentfiber av typen med högtemperatursmältande kärna och lågtemperatursmältande hölje som bindefiber. Uppvärmningen av materialet sker tills bindefibers hölje smält, men avbrytes innan kärnan smälter.

<u>Prover</u>	<u>Beskrivning</u>
EKL, öglematerial	Standard, stickat polyestertyg belagt med polypropen, ytvikt 90 g/m ² (PET 47,5, PP 42,5 g/m ²)
5 08-370K	Slätkalandrerad, långa smältfibrer
08-378, grova fibrer	Sida-vid-sida-fibrer, som krymper och spiraliserar in-line
08-379, fina fibrer	Sida-vid-sida-fibrer, som krymper och spiraliserar in-line
10	

BESTÄMNING AV SKJUVNINGSKRAFTEN HOS ETT KARDBORRESYSTEM

15 Princip

Hakmaterialet och öglematerialet sammanfogas på ett kontrollerat sätt.

Skjuvningskraften mäts sedan med en dragprovare.

Provberedning

- 20 ■ Välj provkombination enligt Fig. 1. MD betecknar maskinriktning och CD betecknar tvärriktning.
- Stansa ut ögleproverna, 50 x 60 mm och markera med penna enligt Fig. 2A, B. I Fig. 2A visas en rulle öglematerial 1 och i Fig. 2B en rulle hakmaterial 2.
- Klipp/skär ut hakproverna, 25 x 80 mm, och markera med stjärna respektive pil
- 25 för att visa respektive riktning på provet.
- Gör en markering 30 mm in från kanten på hakprovet enligt Fig. 3A.
- I första hand skall CD riktningarna testas.

Utförande

- Placera försiktigt hakprovet 2 över ögleprovet 1. Kontaktytan skall vara 30 x 25 mm. Se Fig. 3A.
- 5 Placera hak- 2 och ögleprovet 1 i rullapparaten och låt tryckrullen 3 rulla fram och tillbaka en gång (1 cykel), se Fig. 4.
- Placera hela provet i dragproven 4 med hakmaterialet 2 i den övre klämman 5 och öglematerialet 1 i den nedre klämman 6 såsom visas på Fig. 5. Dragning sker så som visas med pilen F.
- 10 ■ Utför testet tills materialen är helt "delaminerade"

Beräkningar och angivande av resultat

- T_{\max} = Skjuvningskraften, N/cm^2
- 15 F_{\max} = Den högsta kraften detekterad under "delamineringen", N
- l = Längden av kontaktytan, mm
- b = Bredden av kontaktytan, mm
- T_{\max} = $\frac{F_{\max} \times 100}{l \times b}$

20

BESTÄMNING AV DELAMINERINGSKRAFTEN HOS ETT KARDBORRESYSTEM

25 Princip

Hakmaterialet och öglematerialet sammanfogas på ett kontrollerat sätt.
Delamineringskraften mäts sedan, med materialet i 90° med en dragprovare.

Provberedning

- Välj provkombination enligt Fig. 1.
 - Stansa ut ögleproverna 1 , 50 x 60 mm, och markera med penna enligt Fig. 2A.
 - 5 ■ Klipp/skär ut hakproverna 2, 25 x 80 mm, och markera med stjärna respektive pil för att visa respektive riktning på provet enligt Fig 2B.
 - Gör en markering 30 mm från kanten på hakprovet 2 - se Fig 3B.
- I första hand skall CD riktningarna testas.

10 Utförande

- Placera en så stor tejpbiter 7 över hakprovet 2 att en yta på 25 x 30 mm lämnas fri.
- Placera hakprovet 2 över ögleprovet 1. Lämna 10 mm av ögleremsan för fästsättning i klämman, se Fig. 3B.
- 15 ■ Placera hak- 2 + ögleprovet 1 i rullapparaten och låt tryckrullen 3 rulla fram och tillbaka 1 gång (1 cykel) - se Fig. 4. Börja rulla i riktningen bilden visar.
- För att skapa en definierad skjuvningskraft, placeras den utskjutande delen av öglematerialet 1 i en klämma 8 och den utskjutande delen av hakmaterialet 2 i en klämma 9 med en 1 kg vikt.
- 20 ■ Låt vikten hänga fritt i 10 sekunder, se Fig. 6.
- Placera provet i dragprovaren 4 med hakdelen 2 i den övre klämman 5 och ögledelen 1 i den nedre klämman 6.
- Utför testet med de två materialen i 180° öppningsvinkel - se Fig 7.
- 25 ■ Om så önskas kan delamineringskraften vid upprepade öppning och stängning bestämmas. Detta kan endast utföras om ingen deformation av materialet uppstår under test.

Beräkning och angivande av resultat

Metoden mäter de högsta topparna (max 20) under testet

$F_{\max} \text{ N/25mm}$ = Den högsta toppen under test

5 $F_{\text{med}} \text{ N/25mm}$ = medelvärdet av alla topparna under testet

Vid de beskrivna provningarna bör skjuvkraften för öglematerialet ligga mellan 40 och 100 N/7,5 cm² och delamineringskraften mellan 2 och 5 N/25 mm

- 10 (medelbelastning) resp. mellan 3 och 8 N/25 mm (toppbelastning). Alltför höga värden innebär att det är svårt att lossa hak- och ögledelen från varandra utan att dessa rivs sönder eller någondera delen lossnar från underlaget, medan alltför låga värden medför en otillräcklig fästförmåga. Såsom framgår av det följande uppvisar föreliggande material de önskade egenskaperna och överträffar i flera fall
- 15 referensmaterialet EKL.

Resultaten visas i följande tabell 2:

Tabell 2

Fästorgan	Ytvikt g/m ²	Skjuvkraft, N/7,5 cm ² Toppbelastning, C:3			Delamineringskraft, N/25 mm Medelbelastning, C:3			Delamineringskraft, N/25 mm Toppbelastning, C:3		
		Medel	Max	Min	Medel	Max	Min	Medel	Max	Min
EKL	90	70			3,5			5,5		
08-370K	60	82	89	75	3	4	3	5	6	4
	80	92	101	80	3,5	4	3	5,5	6,5	4,5
	100	47	57	21	2,5	3	2	4	6,5	3
08-378	80	73	77	68	4	5	3	6	7	5
08-379	80	43	48	40	2	2	1,2	3	4	2

5 Bästa resultat för skjuvkraft visade prov 08-370K följt av 08-378, som dock gav något högre delamineringskraft.

Samtliga tester är utförda med standard hook C200 från 3M.

På Fig 8 visas schematiskt en blöja där fästmaterialet enligt uppfinning kan användas. Blöjan omfattar ett absorberande skikt anordnat mellan ett vätskegenomsläppligt inre skikt avsett att vara vänt mot en användare och ett vätsketätt yttre skikt avsett att vara vänt från användaren. Blöjan har väsentligen rektangulär form och avgränsas av två kortsidor 10, 11 och två långsidor 12, 13. Två tejpbitar med hakmaterial 2 är fastsatta på blöjans utsida, vid ena kortändan 10, så att en fri del av vardera tejpbiten bildar en förlängning av kortsidan, varvid hakmaterialet är riktat åt samma håll som insidan på blöjan. På blöjans utsida vid andra kortändan 11 är i vardera hörnet en bit öglematerial 1 enligt uppfinningen fastsatt. Då blöjan anbringas på en användare böjs dess mittparti runt grenen och kortsidorna 10, 11 kommer att ligga runt användarens midja. Blöjan fästes genom att tejpbitarna med hakmaterial 2 appliceras på bitarna av öglematerial 1. Det är även möjligt att i stället för två bitar öglematerial i vardera hörnet på kortsidan 11 använda en remsa av detta material längs hela kortsidan. Detta visas som en streckad linje på Fig 8.

Fiberduken enligt uppfinningen kan även användas i den typ av blöja eller inkontinensskydd som beskrives i tex US-A-5 549 593. Denna typ visas på Fig. 9 och 10 och omfattar en absorptionsdel 14, den faktiska blöjan, som är utbytbar och sättes fast på ett bälte 15 runt användarens midja. Absorptionsdelen 14 omfattar ett absorberande skikt anordnat mellan ett vätskegenomsläppligt inre skikt avsett att vara vänt mot en användare och ett vätsketätt yttre skikt avsett att vara vänt från användaren. Två band av hakmaterial 2 är anordnade längs vardera kortsidan 10, 11 på absorptionsdelen 14, på dess utsida. På bältets 15 insida är en fiberduk 1 med fästyta enligt uppfinningen anordnad som öglematerial. Kortändarna 10, 11 på absorptionsdelen 14 kan föras in under bältet, varvid hakmaterialet 2 utefter dess ytterkanter samverkar med öglematerialet 1 på bältets 15 insida för att hålla fast blöjan på användaren. Alternativt är det möjligt att utnyttja öglematerial 1 på absorptionsdelen 14 och hakmaterial 2 på bältet 15. En annan variant är att ha en

- fästyta (antingen han- eller hondel) på bältets 15 utsida, varvid på absorptionskroppen 14 banden med hak- resp. öglematerial anordnas på insidan, dvs den sida som skall vara vänd mot användaren. Den del av kardborresystemet som är anordnad på bältet 15 kan antingen vara ett sammanhängande band såsom visas på
- 5 Fig. 10 eller uppdelat på flera mindre bitar.

Ovanstående användningar utgör endast exempel och är ej avsedda för begränsning av uppfinningen. Föreliggande fästorgan kan användas i alla sammanhang där ett kardborresystem med han- och hondel användes.

Patentkrav

1. Fiberduk med fästyta för handelen i ett kardborresystem, vilken består av ett kardat och nålat flor av funktionella fibrer och bindefibrer, där de funktionella
5 fibrerna utgöres av termoplastiska polymerfibrer och där duken är bunden genom delvis smältning av bindefibrerna.
2. Fiberduk enligt kravet 1, **kännetecknad** av att de funktionella fibrerna utgöres av en eller flera typer av polyesterfibrer och/eller polypropenfibrer.
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3. Fiberduk enligt krav 2, **kännetecknad** av att två typer av funktionella polyesterfibrer med olika grovlek ingår i duken.
4. Fiberduk enligt något av kraven 1-3, **kännetecknad** av att de funktionella
15 fibrerna omfattar spiraliserade två- eller flerkomponentfibrer av sida-vid-sida-typ.
5. Fiberduk enligt krav 4, **kännetecknad** av att de funktionella fibrerna omfattar både krusade polyesterfibrer och spiraliserade fibrer.
- 20 6. Fiberduk enligt något av kraven 1-5, **kännetecknad** av att den innehåller 10-25 vikt-% bindefibrer och 75-90 vikt-% funktionella fibrer.
7. Fiberduk enligt något av kraven 1-6, **kännetecknad** av att de funktionella fibrerna till 40-60 vikt-% utgöres av spiraliserade fibrer.
25
8. Fiberduk enligt något av kraven 1-7, **kännetecknad** av att bindefibrerna utgöres av tvåkomponentfibrer med en kärna och ett hölje, där den yttre höljekomponenten har lägre smältpunkt än den inre kärnkomponenten.

9. Förfarande för framställning av en fiberduk med fästyta enligt krav 1,

kännetecknat av att ett flor kardas av en blandning av bindefibrer och funktionella fibrer, att floret nålas för åstadkommande av ett tätt material med struktur lämplig för att handelen i ett kardborrelås skall fästa därvid och att det nålade floret

5 uppvärms för delvis smältning av bindefibrerna.

10 Förfarande enligt krav 9, **kännetecknat av** att det nålade och uppvärmda floret slätkalandreras så att dess ena yta blir slät.

10 11. Förfarande enligt krav 9 eller 10, **kännetecknat av** att bindefibrerna utgöres av tvåkomponentfibrer med kärna och hölje, där höljet har lägre smältpunkt, och att det nålade floret upphettas så att bindefibrernas hölje smälter, men kärnan förblir fast.

15 12. Absorberande alster (14), såsom blöja eller inkontinensskydd, vilket omfattar ett väsentligen vätskeogenomträngligt yttre skikt och ett kardborresystem med handel och handel fästa vid detta skikt för att samverka och hålla alstret på plats på en användare, **kännetecknat av** att hondelen (1) i systemet utgöres av en fiberduk enligt något av kraven 1-8.

20 13. Alster enligt krav 12, **kännetecknat av** att det omfattar en absorptionskropp innesluten mellan ett vätskegenomsläppligt inre skikt avsett att vara vänt mot användaren och det väsentligen vätskeogenomträngliga yttre skiktet avsett att vara vänt från användaren och avgränsas av två kortsidor (10, 11) och två långsidor (12, 13), varvid två flikar med handelen (2) till kardborresystemet är fästa på det yttre
25 skiktet vid vardera långsidan (12, 13), nära den ena kortsidan (10), så att de bildar en förlängning av kortsidan, med handelens fästyta vänd i samma riktning som det inre skiktet, och att hondelen (1) är anordnad på det yttre skiktet, vid andra kortsidan (11).

14. Alster enligt krav 13, **kännetecknat av** att hondelen (1) är anordnad som en bit i vardera hörnet av den andra kortsidan (11).

5 15. Alster enligt krav 13, **kännetecknat av** att hondelen (1) utgöres av en remsa som sträcker sig utefter väsentligen hela den andra kortsidan (11).

10 16. Alster enligt krav 12, **kännetecknat av** att det omfattar två delar, ett bälte (15) avsett att fästas runt midjan på en användare och en absorptionsdel (14), som vid användning fästes vid bältet genom samverkande han- resp. hondelar (1, 2) i kardborresystemet och som omfattar en absorptionskropp innesluten mellan ett vätskegenomsläppligt inre skikt avsett att vara vänt mot användaren och det väsentligen vätskeogenomträngliga yttre skiktet avsett att vara vänt från användaren och avgränsas av två kortsidor (10, 11) och två långsidor (12, 13), varvid de samverkande delarna (1, 2) är anordnade längs absorptionskroppens kortsidor (10, 15 11) resp. på bältet (15).

17. Alster enligt krav 16, **kännetecknat av** att hondelen (1) är anordnad på bältets (15) insida och handelen (2) är anordnad på absorptionskroppens (14) utsida.

20 18. Alster enligt krav 16, **kännetecknat av** att handelen (2) är anordnad på bältets (15) insida och hondelen (1) är anordnad på absorptionskroppens (14) utsida.

19. Alster enligt krav 16, **kännetecknat av** att handelen (2) är anordnad på bältets (15) utsida och hondelen (1) är anordnad på absorptionskroppens (14) insida.

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20. Alster enligt krav 16, **kännetecknat av** att hondelen (1) är anordnad på bältets (15) utsida och handelen (2) är anordnad på absorptionskroppens (14) insida.

21. Användning av en fiberduk med fästytta enligt något av kraven 1-8, vilken består av ett kardat och nålat flor av funktionella fibrer och bindefibrer, där de funktionella fibrerna utgöres av termoplastiska polymerfibrer och där duken är bunden genom delvis smältning av bindefibrerna, såsom hondel i ett kardborresystem i ett
- 5 absorberande alster (14), såsom blöja eller inkontinensskydd, vilket alster omfattar ett väsentligen vätskeogenomträngligt yttre skikt och ett kardborresystem med hondel och handel fästa vid detta skikt för att samverka och hålla alstret på plats på en användare.

Sammandrag

Fiberduk (1) med fästytta för handelen (2) i ett kardborresystem, vilken består av ett kardat och nålat flor av funktionella fibrer och bindefibrer, där de funktionella
5 fibrerna utgöres av termoplastiska polymerfibrer och där fiberduken är bunden genom delvis smältning av bindefibrerna.

Förfarande för framställning av en sådan fiberduk (1) genom att ett flor kardash av en blandning av bindefibrer och funktionella fibrer, floret nålas för åstadkommande av
10 ett tätt material med struktur lämplig för att handelen i ett kardborresystem skall fästa därvid och det nålade floret uppvärms för delvis smältning av bindefibrerna.

Absorberande alster, såsom en blöja, med en absorptionskropp innesluten mellan ett yttre och ett inre skikt och omfattande ett kardborresystem för att fästa alstret på en
15 användare, varvid handelen (1) i systemet utgöres av en fiberduk enligt uppfinningen.

Användning av en fiberduk enligt uppfinningen såsom handel i kardborresystemet i ett absorberande alster enligt uppfinningen.